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EXAMINER

SALVITTI, MICHAEL A

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JUN GAO, XIANG-MING KONG, KLAUS-DIETER
HUNGENBERG, and JURGEN SCHMIDT-THUMMES

Appeal 2010-007215
Application 10/566,248
Technology Center 1700

Before CATHERINE Q. TIMM, BEVERLY A. FRANKLIN, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

I. STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision to reject claims 1, 4, 6-11, and 14-22 under 35 U.S.C. § 103(a) as unpatentable over Costanza et al., US 4,003,871, issued Jan. 18, 1977, and claim 5 under 35 U.S.C. § 103(a) over Costanza in view of Glück et al., US 5,908,872, issued Jun. 1, 1999.

We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

Appellants' invention relates to a process for preparing an aqueous polymer dispersion. All of the claims require forming a reaction mixture in a reaction vessel, and, thereafter, metering a monomer and the main amount of water-soluble free radical initiator into the reaction mixture within the vessel (Claim 1). The initial reaction mixture includes an oil-soluble free radical initiator as well as demineralized water and a dispersant (*id.*). During the metering of the monomer, the reaction mixture is heated from a temperature less than or equal to the starting reaction temperature T_S to an end reaction temperature T_E (*id.*). During heating, the half-life of the oil-soluble free radical initiator decreases from ≥ 10 hours at the starting reaction temperature T_S to ≤ 5 hours end reaction temperature T_E , i.e., the oil-soluble initiator becomes more reactive.

Claim 1 is illustrative:

1. A process for the preparation of an aqueous polymer dispersion by free radical aqueous emulsion polymerization comprising polymerizing at least one ethylenically unsaturated compound (monomer) in the presence of at least one dispersant, wherein

- a) into a reaction vessel at a temperature which is less than or equal to the starting reaction temperature T_S ,
 - a₁) at least one portion of *demineralized water*,
 - a₂) at least one portion of at least one *oil-soluble free radical initiator*,
 - a₃) at least one portion of at least one *dispersant*,
 - a₄) optionally, a portion of the at least one monomer and

a₅) optionally, a portion of at least one water-soluble free radical initiator

are initially added to form a reaction mixture in the reaction vessel, thereafter

e) the reaction mixture obtained is, optionally, heated to the starting reaction temperature T_s , and thereafter

f) *the following are metered into the reaction mixture:*

c₁) optionally, the remaining amount of demineralized water,

c₂) optionally, the remaining amount of the at least one oil-soluble free radical initiator,

c₃) optionally, the remaining amount of the at least one dispersant,

c₄) the total amount or, optionally, the remaining amount of the *at least one monomer* and

c₅) *the main amount of the at least one water-soluble free radical initiator, and*

g) *the reaction mixture is heated to an end reaction temperature T_E during the metering of the at least one monomer, and wherein*

the at least one water-soluble free radical initiator has a solubility of $\geq 1\%$ by weight at 20°C and atmospheric pressure in demineralized water, and

the at least one oil-soluble free radical initiator has a solubility of $< 1\%$ by weight under the process conditions and

the total amount of water being such that the aqueous polymer dispersion obtained has a solids content of from 20 to 70% by weight,

the at least one water-soluble free radical initiator initiates a free radical polymerization reaction of the at least one monomer at the starting reaction temperature T_S and

at least one oil-soluble free radical initiator has a half-life of ≥ 10 hours at the starting reaction temperature T_S and a half-life of ≤ 5 hours at the end reaction temperature T_E .

(Claim 1, reformatting and emphasis added.)

For the reasons stated by Appellants, we agree that the Examiner erred in finding that Costanza suggests adding dispersant, water, and oil-soluble initiator into a reaction vessel to form an initial reaction mixture and thereafter adding monomer as well as the main amount of water-soluble initiator to the reaction mixture, and increasing the temperature of the reaction mixture from T_S to T_E during metering of the monomer as required by the claims (*see, e.g.*, Br. 5 and 8-10; Reply Br. 2-5). We add the following for emphasis.

As a first matter, the Examiner states that “[a] portion of the added pre-emulsion has been interpreted as being a part of the initial charge, since the heating step (b) [sic, (e)] is optional.” (Ans. 4.) The Examiner has overlooked a key limitation in the claim. The claim requires that all or part of the monomer (c_4) be metered into the initially prepared reaction mixture of water, oil-soluble initiator, and dispersant (a_1 - a_3) *after* the initial reaction mixture is formed (*see* the clause “added to form a reaction mixture in the reaction vessel, thereafter” recited after subpart a_5 of claim 1).

There is no dispute that, in Costanza’s process, it is the pre-emulsion (water, surfactant dispersant, monomer, and, optionally, initiators) that is metered into a reaction medium (water, and optionally, initiators) (Costanza,

col. 2, ll. 10-32; col. 6, ll. 44-56; Example 3). The initially formed reaction medium contains at minimum water, and may also contain initiators, but it does not contain dispersant as required by the claim. In the process of Costanza, the dispersant is metered into the reaction mixture at the same time as the monomer, the monomer is not metered into an initial reaction mixture containing dispersant as required by the claims.

As a second matter, the claims require heating the reaction mixture to an end reaction temperature T_E “during the metering of the at least one monomer” (Claim 1, subpart (g)). The Examiner acknowledges that Costanza is silent as to heating to T_E in Example 3, but relies upon the disclosure in column 7, lines 3-18 as supporting a finding that “it would have been obvious to a person having ordinary skill in the art to heat the reaction mixture to a polymerization temperature at least 10°C above the starting temperature, with the motivation of speeding the polymerization process, as a person having ordinary skill in the art recognizes that higher temperatures result in faster polymerization times.” (Ans. 4-5.)

We do not agree with the Examiner that Costanza provides enough guidance to support this finding. Column 7, lines 3-18 merely states the range at which polymerization will occur (room temperature or lower to about 80°C) and further discloses that “[t]his temperature can be varied as the polymerization proceeds towards substantial completion.” (Costanza, col. 7, ll. 3-8.) What type of variation is contemplated is unclear. Other portions of Costanza disclose “[t]he reaction medium is maintained at a temperature which will initiate and maintain the polymerization reaction” (col. 2, ll. 32-33) and exemplify processes of so maintaining the temperature

(Examples 1 and 3). There is no evidence that Costanza understood the interplay of temperature and reaction rate for the particular addition system of the claim, which meters monomer and water-soluble initiator into a water/dispersant/oil-soluble initiator reaction mixture rather than forming a pre-emulsion and metering it into water/initiator as taught by Costanza.

There is simply no guidance in the reference given for heating in the specific manner claimed in the context of the mixing sequence of the claim.

The defects in the rejection discussed above are not cured by Glück.

III. CONCLUSION

On the record before us, we do not sustain the rejections maintained by the Examiner.

IV. DECISION

The decision of the Examiner is reversed.

REVERSED

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